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Chapter 1

Pilot study of scan/rescn reproducibility in the corpus callosum and spinal cord

Table 1.1: ICC values for whole CC and individual ROIs for a and ρ estimates.

	Individual ROIs										
	whole CC	G1	G2	G3	B1	B2	В3	I	S1	S2	S3
a	0.66	0.14	0.83	0.56	0.14	0.81	0.46	-0.25	-0.07	0.70	0.94
ρ	0.79	0.74	0.77	0.78	0.44	0.59 -	0.34	0.79	-0.14	0.34	0.73
Gui	delines for	agreen	nent (?): • <	< 0.2:	poor,	0.2 -0	0.4: fair,	0.4 -	-0.6: m	oderate,

^{■ 0.6–0.8:} substantial, $\blacksquare > 0.8$: almost perfect

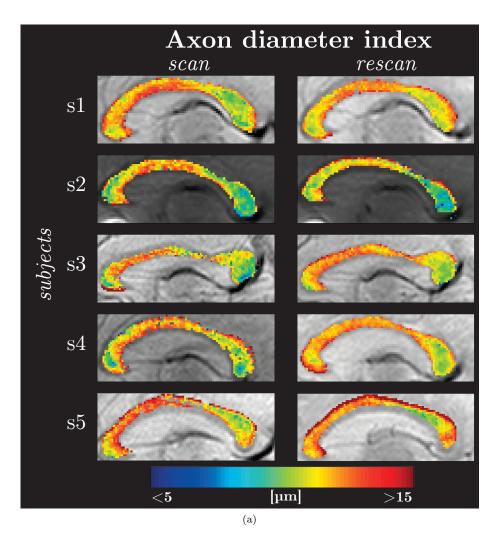


Figure 1.1: XX

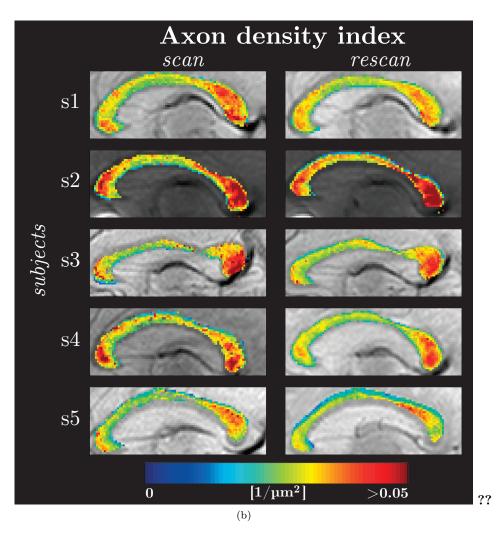


Figure 1.1: XX (continued)

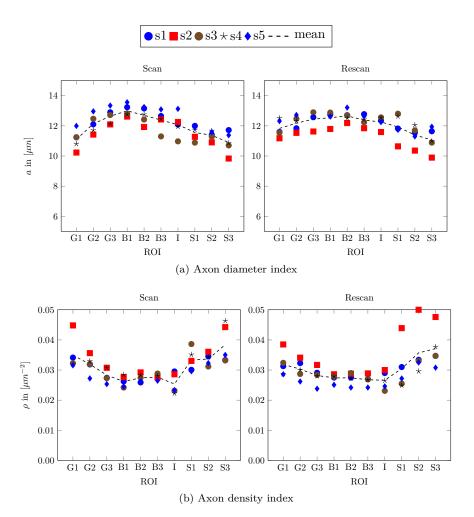


Figure 1.2: Scatter plots of axon diameter (a) and axon density (ρ) indices in all 5 subjects in individual ROIs. The dashed line shows the average over all subjects.

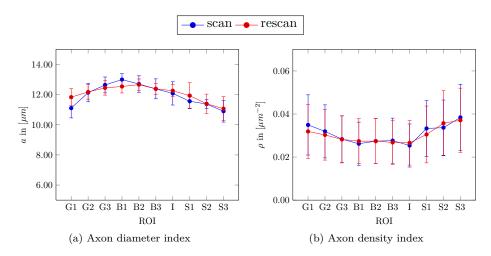


Figure 1.3: Scatter plots of axon diameter (a) and axon density (ρ) indices in all 5 subjects in individual ROIs. The dashed line shows the average over all subjects.

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Bibliography

- Alexander, D. C. (2008). A general framework for experiment design in diffusion MRI and its application in measuring direct tissue-microstructure features. Magnetic Resonance in Medicine, 60(2), 439-448.
- Alexander, D. C., Hubbard, P. L., Hall, M. G., Moore, E. A., Ptito, M., Parker, G. J. M., & Dyrby, T. B. (2010). Orientationally invariant indices of axon diameter and density from diffusion MRI. NeuroImage.
- Assaf, Y., Blumenfeld-Katzir, T., Yovel, Y., & Basser, P. J. (2008). AxCaliber: a method for measuring axon diameter distribution from diffusion MRI. Magnetic Resonance in Medicine, 59(6), 1347–1354.
- Avram, L., Ã-zarslan, E., Assaf, Y., Bar-Shir, A., Cohen, Y., & Basser, P. J. (2008). Three-dimensional water diffusion in impermeable cylindrical tubes: theory versus experiments. NMR Biomed., 21(8), 888–898. URL http://dx.doi.org/10.1002/nbm.1277
- Barazany, D., Basser, P. J., & Assaf, Y. (2009). In vivo measurement of axon diameter distribution in the corpus callosum of rat brain. Brain.
- Cook, P. A., Symms, M., Boulby, P. A., & Alexander, D. C. (2007). Optimal acquisition orders of diffusion-weighted MRI measurements. Journal of Magnetic Resonance Imaging, 25(5), 1051-1058.
 - URL http://dx.doi.org/10.1002/jmri.20905
- Golabchi, F. N., Brooks, D. H., Hoge, W. S., Girolami, U. D., & Maier, S. E. (2010). Pixel-based comparison of spinal cord MR diffusion anisotropy with axon packing parameters. Magn Reson Med, 63(6), 1510–1519.
- Panagiotaki, E., Schneider, T., Siow, B., Hall, M. G., Lythgoe, M. F., & Alexander, D. C. (2012). Compartment models of the diffusion mr signal in brain white matter: A taxonomy and comparison. NeuroImage, 59(3), 2241 - 2254.
 - URL http://www.sciencedirect.com/science/article/pii/ S1053811911011566
- Siow, B., Drobnjak, I., Chatterjee, A., Lythgoe, M. F., & Alexander, D. C. (2012). Estimation of pore size in a microstructure phantom using the optimised gradient waveform diffusion weighted nmr sequence. Journal of Magnetic Resonance, 214(0), 51-60.
 - http://www.sciencedirect.com/science/article/pii/ S1090780711003806

12 BIBLIOGRAPHY

Stanisz, G. J., Wright, G. A., Henkelman, R. M., & Szafer, A. (1997). An analytical model of restricted diffusion in bovine optic nerve. *Magnetic Resonance in Medicine*, 37(1), 103–111.

- URL http://onlinelibrary.wiley.com/doi/10.1002/mrm.1910370115/abstract
- Stejskal, E. O., & Tanner, J. E. (1965). Spin Diffusion Measurements: Spin Echoes in the Presence of a Time-Dependent Field Gradient. *Journal of Chemical Physics*, 42, 288.
- Szafer, A., Zhong, J., & Gore, J. C. (1995). Theoretical model for water diffusion in tissues. *Magnetic Resonance in Medicine*, 33(5), 697-712. URL http://onlinelibrary.wiley.com/doi/10.1002/mrm.1910330516/abstract
- Wang, Y., Wang, Q., Haldar, J. P., Yeh, F.-C., Xie, M., Sun, P., Tu, T.-W., Trinkaus, K., Klein, R. S., Cross, A. H., & Song, S.-K. (2011). Quantification of increased cellularity during inflammatory demyelination. *Brain*, 134(12), 3590–3601.
 - URL http://brain.oxfordjournals.org/content/134/12/3590
- Zhang, H., Hubbard, P. L., Parker, G. J., & Alexander, D. C. (2011). Axon diameter mapping in the presence of orientation dispersion with diffusion mri. NeuroImage, 56(3), 1301–1315.
 - URL http://www.sciencedirect.com/science/article/pii/S1053811911001376